

Appln No. 09/825,599

Amdt date March 1, 2005

Reply to Office action of December 3, 2004

**Amendments to the Specification:**

Please amend the paragraph starting on page 1, line 12 of the Application as follows:

This patent application is further related to the following U.S. Patent Applications filed concurrently herewith and commonly assigned, entitled "A Method of Sharing Information among a Plurality of Stations in a Frame-based Communications Network", Application No. 09/825,708, "A Method of Enhancing Network Transmission on a Priority-enabled Frame-based Communications Network", Application No. 09/825,897, "A Method of Determining a Start of a Transmitted Frame in a Frame-based Communications Network", Application No. 09/825,903, "A Method of Determining an End of a Transmitted Frame in a Frame-based Communications Network", Application No. 09/825,775, "A Method for Providing Dynamic Adjustment of Frame Encoding Parameters in a Frame-based Communications Network", Application No. 09/826,218, "A Method for Selecting Frame Encoding Parameters in a Frame-based Communications Network", Application No. 09/826,435, "A Method for Selecting Frame Encoding Parameters to Improve Transmission Performance in a Frame-based Communications Network", Application No. 09/825,756, "A Method of Determining a Collision Between a Plurality of Transmitting Stations in a Frame-based Communications Network", Application No. 09/825,801, "A Method of Providing Synchronous Transport of Packets Between Asynchronous Network Nodes in a Frame-based Communications

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Network", Application No. 09/825,851, "A Method of Controlling Data Sampling Clocking of Asynchronous Network Nodes in a Frame-based Communications Network", Application No. 09/826,067, "A Method for Distributing Sets of Collision Resolution Parameters in a Frame-based Communications Network", Application No. 09/825,689, "A Method and Apparatus for Transceiver Noise Reduction in a Frame-based Communications Network", Application No. 09/825,638, "A Method for Selecting an Operating Mode for a Frame-based Communications Network", Application No. 09/825,791, and "A Transceiver Method and Signal Therefore Embodied in a Carrier Wave for a Frame-based Communications Network", Application No. 09/826,239.

Please amend the paragraph starting on page 17, line 22 of the Application as follows:

Referring back to the NID analog front end shown in Fig. 4b and a portion thereof shown in Fig. 12, in accordance with the present invention, a split winding transformer with turns ratios optimized for maximum transceiver signal to noise ratio is provided. More broadly, a split winding transformer useful in a modem application is provided. The transmitter output signal level for typical modems is nominally fixed within some guardband of the FCC or other regulatory agency power limit. The signal level at the receiver input, however, is highly variable depending on the channel attenuation in the path from a remote transmitter. Consequently, the ideal line isolation transformer turns ratio from the transmitter output to the line of wt:1 is not optimal for the receiver. At a modest additional

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cost of an additional transformer winding, the turns ratios for the transmitter and receiver can be set independently, while still allowing for hybrid echo cancellation. Since the receiver input signal will usually be less than the transmitter output signal, the optimal turns ratio is  $[[wt:1]]$  wr:1 from input to line where  $wr > wt$ . This step-up from the transmitted signal provides a "noiseless" gain that enhances the achievable receiver S/N ratio. The maximum separation between  $w_t$  and  $w_r$  is limited by the reduction in coupling between transmit and receive windings that occurs for large differences. This introduces phase shift that compromises the effectiveness of common echo cancellation schemes. Practical numbers for the  $w_r:w_t$  ratio are from 1 to 4. Prior art voiceband ADSL modems do not take advantage of this technique. In the case of ADSL, the situation is particularly egregious in that it is common to use step up transformers from modem to line side in order to boost the transmitted signals up to levels required for long distance communication. This means there is actually attenuation of received signals. As can be seen in Fig. 12, filter/transformer/protection components 445, typically including filter/protection components 451 and transformer 453, is coupled in the Transmit and Receiver paths 495 and provides, for example, TX path 455 and RX path 457 to be coupled to TIP and RING of Phoneline RJ11 connector 450 through transformer 453.  $[[Wt:1]]$  wt:1 is transmit winding ratio;  $[[Wr:1]]$  wr:1 is the receive winding ratio; with the reference point, the twisted pair line, being 1. Transformer 453 couples the TIP line to the TX signal path from electronic hybrid 440 via  $w_t:1$  windings.

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Transformer 453 likewise couples the RING line to RX signal path via  $wr:1$  windings. Therefore, in accordance with the present invention, a small signal on the line being received can be stepped up, while on the transmit side on the other hand, a stepping down can occur. Therefore in accordance with the present invention a  $[[Wr]]$   $wr$  of 2 provides a 1 to 2 step up, while on the transmit side a  $[[Wt]]$   $wt$  is  $2/3$  would, in essence provide a ratio of  $[[3 \text{ to } 1]]$  1 to 3 between the transmit and receive transformer windings. As set forth in Fig. 12 common core 459 is provided with three windings thereon, namely tip/ring winding 461a, transmit side winding 461b and receive side winding 461c. The transformer is thereby optimizable to provide the best signal to noise ratio for the transceiver.